

WO 00/13536

PCT/US99/20519

1 SAFETY HARNESS WITH INTEGRAL SUPPORT LINE

This application is a continuation of application Ser. No. 09/149,945,
2 Filed Sep. 9, 1998, now U.S. Pat. No. 5,970,517, and claims the benefit of 60/116,818,
3 Filed Jan. 21, 1999.

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

4 The present invention is directed toward a safety
5 harness having an integral support line.

6 DESCRIPTION OF RELATED ART

7 Firefighters traditionally wear outer clothing that is
8 known in the art as turnout gear. Turnout gear includes a
9 large coat and pants that have an inner liner and an outer
10 layer. The outer layer or shell is constructed from
11 materials that are resistant to abrasion, flame, heat, and
12 water. The inner liner is releasably secured to the outer
13 layer to permit the liner to be removed for cleaning and
14 repair purposes. The inner liner is preferably constructed
15 from materials which provide a heat and moisture barrier.

16 It is known in the art to incorporate a harness into
17 firefighter turnout gear. In this regard, see U.S. Patent
18 Nos. 5,036,548; 5,136,724; 4,625,335; 3,973,643; 4,273,216;
19 4,449,253; and, 4,854,418, the disclosures of which are
20 expressly incorporated herein in their entireties.

21 Other patents disclose garments which include a
22 harness and a drag line. For example, U.S. Patent No.
23 4,706,858 discloses a hunting vest that incorporates a drag
24 line that may be secured to a deer for dragging the deer.
25 U.S. Patent No. 3,074,074 discloses a similar device
26 wherein the harness includes a pouch in which the drag line
27 is stored. See also, U.S. Patent No. 4,955,456. It is
28 noted that, in these references, the disclosures of which
29 are expressly incorporated herein in their entireties, the
30 drag line is secured and accessible at a rear of the
31 garments.

32 Finally, U.S. Patent No. 4,161,266 discloses a

1 lifeline carrier which is carried in an elongated tubular
2 container that is attached to a back-carried air tank.

3 In addition to the turnout gear coat and pants,
4 firefighters also wear a helmet, thick gloves, and a large
5 oxygen tank. As can be appreciated, the equipment is heavy
6 and bulky, and there is understandably a great resistance
7 by firefighters to add any further equipment to what is
8 already in use.

9 Unfortunately, for firefighters entering a burning
10 building, especially a high-rise building, the conventional
11 equipment does not include means to facilitate escape from
12 a window or roof of the building. Moreover, for a
13 firefighter who is injured and incapable of escaping from
14 the building, the conventional equipment does not include
15 means to facilitate lifting, lowering, or dragging the
16 injured firefighter from the building.

17 In the past, an unsatisfactory solution to this
18 problem has been to carry lengths of rope in a coat pocket
19 or a coil of rope over-the-shoulder. However, in a burning
20 building, it takes too long to find the rope, remove it
21 from the pocket, and secure the rope to something/someone
22 to permit escape or rescue. A coil of rope tends to get
23 snagged on things in the building, or is otherwise
24 inconvenient for the firefighter to carry. Therefore, it
25 is common for firefighters to enter tall buildings during a
26 fire with no means of escape.

27 Accordingly, when a firefighter is trapped several
28 floors above the ground, he must now go to a window and
29 hope that his colleagues can get a ladder up to him before
30 he is injured by the fire. When a firefighter is
31 incapacitated, he must be physically lifted and carried, or
32 dragged by his coat by a rescuer. Due to the failure of
33 conventional equipment to provide means to assist in
34 escape/rescue of firefighters, many firefighters are
35 injured and killed each year by being unable to escape from
36 upper floors of multi-floor buildings.

37 Therefore, there exists a need in the art for a means

1 to facilitate escape from upper floors of a building.
2 There also exists a need in the art for a means and method
3 for rescuing incapacitated people from buildings. Finally,
4 there exists a need in the art for firefighter turnout gear
5 that incorporates such escape and rescue means.

6 SUMMARY OF THE INVENTION

7 The present invention is directed toward facilitating
8 escape from upper floors of a building and rescue of
9 injured people from a building. The present invention is
10 also directed toward an escape and rescue line that is
11 built into a harness assembly. The present invention is
12 further directed toward a harness assembly which is
13 incorporated into firefighter turnout gear.

14 In accordance with the present invention, firefighter
15 turnout gear includes a harness assembly which is secured
16 around the firefighters mid-section. The harness assembly
17 is removably fastened to an interior of the firefighter
18 turnout gear. The harness assembly includes a harness body
19 and a support line. The support line is movable relative
20 to the harness body, is accessible from an exterior of the
21 turnout gear, and is easily deployed. In accordance with
22 an alternative embodiment of the present invention, the
23 support line is incorporated into a module which is
24 inserted into an accommodating chamber in the harness body.
25 In accordance with a further alternative embodiment, the
26 support line is incorporated into a module that also
27 provides an accommodating chamber which receives the
28 harness body.

29 In further accordance with the present invention,
30 firefighter turnout gear includes an outer layer and an
31 inner liner. The harness assembly is removably secured to
32 one of the outer layer and inner liner. At least one end
33 of the support line extends through an opening in the outer
34 layer and is accessible to a user on an exterior of the
35 outer layer.

1 In further accordance with the present invention, the
2 support line has a first end with a first carabiner-type
3 clip secured thereto and a second end with a second
4 carabiner-type clip secured thereto. The first end is
5 movable relative to the harness body by pulling the first
6 end and carabiner away from the harness body. The second
7 end is fixed relative to the harness body and is not
8 readily movable relative thereto.

9 In accordance with an alternative embodiment of the
10 present invention, the harness body defines a chamber which
11 receives a support line module. The support line module
12 includes the support line. Once the support line is used,
13 the module is removed from the chamber, and a new module is
14 inserted into the chamber to permit the harness to be re-
15 used while allowing the support line to be easily re-
16 installed into the harness body.

17 In accordance with a further alternative embodiment of
18 the present invention, the harness body is received in a
19 chamber provided by a support line module. The support
20 line module is releasably secured to the turnout gear, and
21 includes the support line. Once the support line is used,
22 the module is removed from the turnout gear, the harness
23 body is removed from the chamber, and the harness body is
24 inserted into new or replacement module which is then
25 inserted into the coat. This permits the harness to be re-
26 used while allowing a new support line to be easily re-
27 installed in the turnout gear and connected to the harness
28 body.

BRIEF DESCRIPTION OF THE DRAWINGS

1

2 These and further features of the present invention
3 will be apparent with reference to the following
4 description and drawings, wherein:

5 FIG. 1 is a schematic illustration of a firefighter
6 wearing a turnout gear coat including a harness assembly
7 according to the present invention;

8 FIG. 2 is a schematic illustration of firefighter
9 turnout gear pants including a harness assembly according
10 to the present invention;

11 FIG. 3 is a perspective view of the harness assembly
12 of FIG. 2;

13 FIG. 4 is a perspective view of the harness assembly
14 of FIG. 1;

15 FIG. 5 is an exploded perspective view of an
16 alternative embodiment of the harness assembly according to
17 the present invention;

18 FIG. 6 is an exploded perspective view of a further
19 alternative embodiment of the harness assembly according to
20 the present invention;

21 FIG. 7 is a schematic illustration of a firefighter
22 wearing a turnout gear coat including a harness assembly
23 according to the third embodiment of the present invention;
24 and,

25 FIG. 8 is a schematic illustration of a turnout gear
26 coat, slightly opened, to reveal placement of the harness
27 assembly relative to the conventional coat closures.

28 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

29 It should be noted that in the detailed description
30 which follows, identical components have the same reference
31 numeral, regardless of whether they are shown in different
32 embodiments of the present invention. It should also be
33 noted that, in order to clearly and concisely disclose the
34 present invention, the drawings may not necessarily be to

1 scale and certain features of the invention may be shown in
2 somewhat schematic form.

3 With reference to FIG. 1, a firefighter turnout gear
4 coat 10 according to the present invention is illustrated.
5 The coat 10 includes an outer layer 12 formed from
6 abrasion, flame, and water resistant material and an inner
7 liner 14 which is a heat and moisture barrier. The inner
8 liner 14 is removably secured to the outer layer 12 to
9 permit the inner liner 14 to be removed for purposes of
10 cleaning and repair. It is submitted that the turnout gear
11 coat described in this paragraph is conventional and well
12 known in the art. Such a coat 10 is also generally
13 described in U.S. Patent No. 5,542,124, the disclosure of
14 which is expressly incorporated by reference herein in its
15 entirety.

16 With reference to FIGS. 1 and 4, secured within the
17 coat 10 is a harness assembly 16. The harness assembly 16
18 includes a harness body 18, a pair of shoulder straps 19,
19 and a support line 20. The harness body 18 is generally
20 constructed as a hollow length of material having a first
21 end 22 and a second end 24. As such, the harness body 18
22 is generally shaped as a belt having an internal chamber
23 for receipt of the support line 20. More preferably, the
24 harness body 18 is constructed so as to provide a series of
25 elongated hollow chambers that each receive a portion of
26 the support line 20, as will be discussed more fully
27 hereafter.

28 The first and second ends 22, 24 of the harness body
29 18 are preferably secured together when the coat 10 is
30 closed, such as by a clip-and-ring fastener 26.

31 Preferably, the shoulder straps 19 and body 18 are
32 adjustable in length to accommodate different size people.

33 The harness body 18 is preferably secured to an inner
34 surface of the coat outer layer 12 in a releasable fashion,
35 such as by a series of snap fasteners, hook-and-loop type
36 fasteners, zippers, or other suitable means of releasable
37 attachment. Instead of being secured to the inner surface

1 of the outer layer 12, the harness body 18 may be
2 alternatively secured to the outer surface of the liner 14,
3 or to the inner surface of the liner.

4 The support line 20 is preferably very long relative
5 to the length of the harness body 18. The length of the
6 support line 20 is dependent upon the available volume in
7 the hollow harness body 18, the cross-sectional area of the
8 line itself, and the allowable weight of the harness
9 assembly 16. It has been found that a support line 20
10 having a flat ribbon shape is preferable as such a shape
11 provides maximum strength while minimizing size and weight.
12 It has been further found that providing a support line 20
13 having a high temperature resistance is necessary due to
14 the environment in which the line will be used. Taking
15 these factors into consideration, the support line 20 is
16 preferably a flat ribbon of heat resistant synthetic
17 fabric, such as Kevlar. A harness assembly 16 according to
18 the present invention with fifty feet of Kevlar support
19 line 20 was found to weigh only about 2-3 pounds, and was
20 hardly noticeable to the wearer thereof.

21 As clearly illustrated in FIG. 4, a portion of the
22 support line 20 is disposed within each of the elongated
23 chambers provided by the harness body 18. Since the
24 support line is preferably shaped as a flat ribbon, several
25 loops of support line may be received in each of the
26 chambers. By separating the support line into a series of
27 individual pockets or chambers, the possibility of support
28 line tangling, twisting, or knotting is substantially
29 eliminated, and the support line 20 can be smoothly and
30 easily withdrawn from the harness body 18.

31 The harness body 18 has a carabiner-type harness clip
32 27 sewn or otherwise fixedly secured thereto. A carabiner-
33 type clip 28, 30 is also secured to each end of the support
34 line 20. As used herein, the term "carabiner-type clip" is
35 intended to refer to any known or hereafter developed clip
36 which forms a closed loop, has a closure member which is
37 normally in a closed position, and which is easily opened

1 by the user.

2 A first one of the carabiners 28 is secured to a first
3 end 32 of the support line 20 and may be pulled outwardly
4 away from the harness body 18 to withdraw the support line
5 20 from the harness body 18. A second one of the
6 carabiners 30 is secured to a second end 33 of the support
7 line 20 and is clipped or secured to the harness clip 27.
8 Accordingly, the second end 33 of the support line 20 is
9 releasably anchored to the harness body 18 through the
10 clips 27, 30. When the support line 20 is completely
11 withdrawn from the harness body 18, the second end 33 of
12 the support line 20 remains secured to the harness body 18
13 until the user disconnects the second carabiner 30 from the
14 harness clip 27.

15 Each of the first and second carabiners 28, 30 extend
16 from the harness body 18 and through a slot-like hole 34 in
17 the outer layer 12 so as to be accessible to the wearer or
18 others from an exterior of the coat 10. The carabiners 28,
19 30 and the hole 34 are normally covered or concealed by a
20 releasable flap 36. The flap 36, which is shown in an open
21 position in FIG. 1, is normally secured in an upright or
22 closed position, preferably by a hook-and-loop type
23 closure, and is simply pulled downwardly to expose the
24 carabiners 28, 30.

25 With reference to FIGS. 2 and 3, a second embodiment
26 of the present invention is illustrated wherein a harness
27 assembly 16' is incorporated into turnout gear pants 40.
28 In the following description of the second embodiment,
29 identical reference numerals will be used as in the first
30 embodiment when appropriate.

31 The pants 40 are constructed generally identically to
32 the coat shown in FIG. 1, and have an outer layer 12 and a
33 removable inner liner 14. A harness assembly 16' is
34 preferably secured to the interior surface of the outer
35 layer 12 near a waist portion of the pants 40.
36 Alternatively, the harness assembly 16' may be secured to
37 the inner or outer surface of the inner liner 14, as

1 desired.

2 As in the previously described first embodiment, the
3 harness assembly 16' includes a harness body 18 and a
4 support line 20. The harness body 18 is generally
5 constructed as a hollow length of material having a first
6 end 22 and a second end 24. More preferably, and as
7 discussed previously, the harness body 18 is constructed so
8 as to provide a series of elongated hollow chambers that
9 each receive a portion of the support line 20. As such,
10 the harness body 18 is generally shaped as a belt having an
11 internal chamber or chambers for receipt of a support line
12 20. The first and second ends 22, 24 of the harness body
13 18 are preferably secured together when the pants 40 are
14 closed, such as by a clip-and-ring type fastener 26. The
15 harness body 18 is secured to the selected internal surface
16 of the pants 40 in a desired releasable manner, as
17 described hereinbefore.

18 The support line 20 is preferably very long relative
19 to the length of the harness body 18, and is preferably
20 made from a flat ribbon of synthetic, heat-resistant
21 fabric, such as Kevlar or the like. The harness body 18
22 has a harness clip 27 sewn or otherwise fixedly secured
23 thereto.

24 As clearly illustrated in FIG. 3, a portion of the
25 support line 20 is disposed within each of the elongated
26 chambers provided by the harness body 18. Since the
27 support line is preferably shaped as a flat ribbon, several
28 loops of support line may be received in each of the
29 chambers. By separating the support line into a series of
30 individual pockets or chambers, the possibility of support
31 line tangling, twisting, or knotting is substantially
32 eliminated, and the support line 20 can be smoothly and
33 easily withdrawn from the harness body 18.

34 A carabiner 28, 30 is secured to each end of the
35 support line 20. A first one of the carabiners 28 is
36 secured to a first end 32 of the support line 20 and may be
37 pulled outwardly away from the harness body 18 to withdraw

1 the support line 20 from the harness body 18. A second one
2 of the carabiners 30 is fixedly secured to the harness clip
3 27 and is releasably anchored to the harness body 18
4 therethrough.

5 Each of the carabiners 28, 30 extend from the harness
6 body 18 and through a slot-like hole 34 in the outer layer
7 12 so as to be accessible to the wearer or others from an
8 exterior of the pants 40. The carabiners 28, 30 and the
9 hole 34 are normally covered or concealed by a releasable
10 flap 36. The flap 36, which is shown in an open position
11 in FIG. 2, is normally secured in an upright or closed
12 position, preferably by a hook-and-loop type fabric
13 closure, and is simply pulled downwardly to expose the
14 carabiners 28, 30.

15 In either embodiment, should a firefighter need the
16 support line 20 or a support, the flap 36 can pulled down
17 to expose the carabiners 28, 30. Thereafter, the first
18 carabiner 28 can be pulled to extend the support line 20
19 from the harness assembly 16. Alternatively, an additional
20 line (not shown) can be secured to the second carabiner 30
21 to facilitate lifting of the firefighter.

22 In the event of a window escape, the first carabiner
23 28 could be secured to a fixed support or a large piece of
24 furniture to permit the firefighter to exit the building
25 via a window. Alternatively, the firefighter may secure
26 the first carabiner 28 to a telescoping rod or other tool
27 (not shown) which is specially made or adapted for jamming
28 into windows to support of the firefighter during the repel
29 from the window. Such a tool may be stored in a pants
30 pocket 44 or a coat pocket (not shown). When the
31 firefighter reaches ground level or otherwise wants to
32 disconnect from the support line 20, he simply has to
33 release the second carabiner 30 from the harness clip 27 to
34 free himself from the support line 20.

35 It is believed that the ability to escape from a
36 window of a burning building is of great importance for
37 firefighters. It is further believed that, even when the

1 elevation is such that the support line 20 will not extend
2 to the ground level, the importance of being able to exit
3 the building via the window cannot be overemphasized. This
4 is because fires are often-times confined to one or two
5 floors of a building. Therefore, it is possible that, by
6 exiting the floor that is on fire and lowering himself two
7 or three floors down, the firefighter can escape danger of
8 injury in the fire, and be in a better position to escape
9 from the building.

10 In the event that a first firefighter is helping
11 rescue a second, injured firefighter, the first firefighter
12 could secure his first carabiner 28 to the injured
13 firefighter's second carabiner 30, and thereafter hoist,
14 drag, or lower the injured firefighter to safety.
15 Accordingly, the second carabiner 30 can serve as a point
16 of attachment to facilitate rescue of an injured
17 firefighter.

18 With reference to FIG. 5, an alternative harness
19 assembly 16'' is illustrated. Although the alternative
20 construction of FIG. 5 is shown with regard to a belt-type
21 harness assembly, it is considered apparent that the
22 alternative construction is equally applicable to a
23 shoulder harness, and may be readily incorporated into the
24 turnout gear pants or coat.

25 The harness assembly 16'' includes a harness body 18',
26 a support line module 21, and a support line 20. The
27 harness body 18' has a first end 22 and a second end 24,
28 and a hollow portion or chamber 23 extending generally
29 between the first and second ends 22, 24. The harness body
30 carabiner 27 is secured to the harness body first end 22.
31 A clip-and-ring type fastener 26 is provided to secure the
32 first and second ends 22, 24 together, as illustrated.

33 The support line module 21 is shaped generally as a
34 hollow pouch or length of material, and is adapted to
35 receive the support line 20. More specifically, and as
36 illustrated in FIG. 5 and described previously with regard
37 to the embodiments shown in FIGS. 3 and 4, the support line

1 module 21 preferably defines a series of elongated, hollow
2 chambers which each receive a portion of the support line
3 20.

4 The module 21 is adapted to be slidably inserted into
5 and removed from the hollow chamber 23 of the harness body
6 18'. When the module 21 is installed within the chamber
7 23, the support line first and second ends 32, 33, with
8 associated carabiners 28, 30, are positioned near the
9 harness body first end 22. The second carabiner 30 is
10 secured to the harness body carabiner 27. It is noted
11 that, after the module 21 is inserted into the chamber 23
12 and the second carabiner 30 is secured to the harness body
13 carabiner 27, operation of the harness body 16'' is
14 substantially identical to that of the harness body 16, 16'
15 described hereinbefore.

16 However, with the alternative construction shown in
17 FIG. 5, once the support line 20 is removed from the
18 harness assembly 16'', the module 21 is simply slidably
19 removed from the chamber 23, and replaced with a new module
20 having a fresh or new support line 20 therein.
21 Accordingly, the alternative construction greatly
22 simplifies replacement of the support line. This is
23 considered quite important in safety harness applications
24 wherein a support line may only be used one time before it
25 is discarded.

26 With reference to FIG. 6, an alternative embodiment of
27 a harness assembly 160 according to the present invention
28 is illustrated and, in FIGS. 7-8, is shown incorporated
29 into a turnout gear coat. It is believed apparent that the
30 third embodiment is structurally similar to the second
31 embodiment of the harness assembly illustrated in FIG. 5
32 and discussed above. Although the alternative construction
33 of FIG. 6 is shown with regard to a belt-type harness
34 assembly, it is considered apparent that the alternative
35 construction is equally applicable to a shoulder harness
36 (FIGS. 7-8), and may be readily incorporated into the
37 turnout gear pants or coat.

1 The harness assembly 160 includes a harness body 180,
2 a support line module 210, and a support line 200. The
3 harness body 180 has a first end 220 and a second end 240.
4 A loop of material 270 is secured to the harness body first
5 end 220, preferably by stitching or equivalent permanent
6 attachment means. A clip-and-ring type fastener 260 is
7 provided to secure the first and second ends 220, 240
8 together, as illustrated.

9 The support line module 210 is shaped generally as a
10 hollow pouch or length of material, and is adapted to
11 receive the support line 200. More preferably, and as
12 illustrated in FIG. 6, the support line module 210 defines
13 a series of elongated, hollow chambers which each receive a
14 portion of the support line 200. As discussed previously,
15 since the support line is preferably shaped as a flat
16 ribbon, several loops of the support line 200 may be
17 received in each of the elongated chambers.

18 The support line module 210 also defines, at one side,
19 a harness chamber 212 into which the harness body 180 is
20 slidably inserted. During assembly, the harness body 180
21 is slidably inserted or threaded through the harness
22 chamber 212, and the first and second ends 220, 240 of the
23 harness body 180 project from opposite ends of the harness
24 chamber 212. When the harness body is inserted into the
25 harness chamber 212, the support line first and second ends
26 320, 330, with associated carabiners 280, 300, are
27 positioned near the harness body first end 220. The second
28 carabiner 300 is secured to the harness body loop 270. It
29 is noted that, after the harness body 180 is inserted into
30 the harness body chamber 212 and the second carabiner 300
31 is secured to the harness body loop 270, operation of the
32 harness body 160 is substantially identical to that of the
33 harness body 16, 16', 16'' described hereinbefore.

34 The support line module 210 also preferably has a
35 strip of hook-and-loop type fastener 222 secured to a side
36 thereof opposite the harness chamber. The fastener strip
37 222 cooperates with a mating strip provided on the inside

1 surface of the coat outer layer to removably secure the
2 harness assembly 160 to the coat.

3 In the alternative construction shown in FIG. 6, the
4 module 210 is easily removed and replaced after use of the
5 support line to provide a new support line for future use.
6 Once the support line 200 is deployed or removed from the
7 support line module 210 and needs to be replaced, the
8 harness assembly 160 is removed from the coat or pants, and
9 the harness body 180 is slidably removed from the harness
10 body chamber 212. The harness body 180 is then slidably
11 inserted into a harness body chamber of a new module having
12 a fresh or new support line 200 therein, and then the
13 original harness body 180 and new support line module 210
14 are re-installed in the coat or pants. Accordingly, this
15 alternative construction, like that discussed previously
16 with regard to the embodiment shown in FIG. 5, greatly
17 simplifies replacement of the support line. This is
18 considered quite important in safety harness applications
19 wherein a support line may only be used one time before it
20 is discarded.

21 As noted hereinbefore, and with reference to FIGS. 7
22 and 8, a turnout gear coat 335 conventionally includes an
23 inner liner 340 and an outer layer 350. Such coats also
24 have a front opening 360 that is bounded by first and
25 second edges or sides 362, 364 of the outer layer 340 of
26 the coat. Each of the edges includes an inner flap of
27 material 370 and an outer flap of material 372a, 372b.
28 Each inner flap 370 is secured to the inner liner 340,
29 preferably by snap-type fasteners 374. The inner flaps 370
30 also cooperate to provide a series of closures 366 that
31 releasably affix the inner flaps 370 to one another to
32 close the front opening 360. The outer flaps of material
33 are provided such that one outer flap 372a (left hand side
34 outer flap of FIGS. 7-8) is folded over and secured to the
35 other outer flap 372b to cover and protect the inner flaps
36 370, and further close the front opening 360. Hook-and-
37 loop type fastener strips 376 are affixed to the outer

1 flaps 372a, 372b to permit easy opening/closing of the
2 outer flaps. The present invention provides structural
3 modifications to the above-described conventional turnout
4 gear coat to permit incorporation of the harness assembly
5 160 therein.

6 The harness assembly 160 of FIG. 6 is shown disposed
7 within the turnout gear coat 335 in FIGS. 7 and 8. The
8 harness assembly 160 is preferably secured to the inner
9 surface of the outer layer 350, i.e., between the outer
10 layer 350 and the inner liner 340. Also as noted
11 previously, the fastener strip 222 on the outer surface of
12 the support line module 210 cooperates with a like or
13 mating fastener strip (not shown) on the inner surface of
14 the outer layer 350 to releasably secure the harness
15 assembly 160 to the turnout gear coat 335.

16 Each of the inner flaps 370 has a passageway or
17 opening 380, 382 formed therein through which an end of the
18 harness body extends, as illustrated. More specifically,
19 and as shown in FIGS. 7 and 8, the first end 220 of the
20 harness body 180 projects from a first opening 380 and a
21 second end 240 of the harness body 180 projects from a
22 second opening 382. The first and second ends 220, 240 of
23 the harness body 180 are therefore available to the wearer
24 and easily attached to affix the harness in place at the
25 same time as the inner flaps 370 are secured to one another
26 via the closures 366 as the coat 335 is being put on.

27 A short sleeve 386 may be provided between the first
28 opening 380 and the support line module 210, as
29 illustrated. The inclusion of the short sleeve 386 will
30 help ensure that the carabiners 280, 300 and harness loop
31 270 are retained in a desired and easily accessible
32 position relative to the first opening 380.

33 As shown best in FIG. 8, when the outer flaps 372a,
34 372b are in an open position, the first carabiner 280 is
35 preferably partially extending from the first opening 380
36 while the second carabiner 300 and loop 270 are slightly
37 beneath the inner flap 370 and received within the sleeve

1 386 (if provided). The first carabiner 280 may be
2 releasably secured to the inner flap 370 adjacent the first
3 opening 380 by hook-and-loop type fasteners (now shown) or
4 other means.

5 As shown best in FIG. 7, when the front opening 360 is
6 covered and the outer flaps 372a, 372b are in a closed
7 position, the entire harness assembly 160 is concealed and
8 protected.

9 If a firefighter needs access to the support line 200,
10 a portion of the outer flaps 372a, 372b are pulled back to
11 permit access to the first carabiner 280. The inner flaps
12 370 and a major portion of the outer flaps 372a, 372b
13 remain closed. The first carabiner 280 is pulled to
14 withdraw the support line 200 from the support line module
15 210, as discussed hereinbefore with regard to the previous
16 embodiments of the invention.

17 If a firefighter needs access to the harness loop 270,
18 which serves as a good hand-hold for dragging or lifting a
19 firefighter, or to the second carabiner 300, he must merely
20 reach inside the first opening 380 and grasp same. The
21 harness body 180 is disposed within the support line module
22 210 such that pulling on the second carabiner 300 or the
23 harness loop 270 will permit the second carabiner 300 and
24 harness loop 270 to be withdrawn through the first opening
25 380.

26 It is noted that the foregoing description of the
27 placement and operation of the embodiment shown in FIGS. 6-
28 8 is also applicable to turnout gear pants, which likewise
29 conventionally include an outer layer and an inner liner,
30 and include structural features that correspond to the
31 inner and outer flaps set forth above. It will also be
32 appreciated that this embodiment provides the benefits of
33 the present invention without requiring substantial
34 structural modifications to the turnout gear.

35 While the preferred embodiments of the present
36 invention are shown and described herein, it is to be
37 understood that the same is not so limited but shall cover

1 and include any and all modifications thereof which fall
2 within the purview of the invention. For example, although
3 the support line module is described herein as being
4 slidably received within the harness body portion chamber,
5 or as slidably receiving the harness body portion in a
6 harness chamber, it is considered apparent that various
7 equivalent structures for releasably securing the module
8 and the harness body portion to one another could be
9 devised by one skilled in the art. For example, the module
10 and the harness body portion may be releasably secured to
11 one another by fasteners, such as snaps, buttons, or hook-
12 and-loop type fabric. Moreover, even though the harness
13 assembly shown in connection with the turnout gear coat
14 includes shoulder straps 19, it may be preferred to
15 eliminate the shoulder straps from the coat harness
16 assembly. Finally, it should be appreciated that the
17 harness assembly according to the various embodiments of
18 the present invention are useful apart from firefighter
19 turnout gear, and may be used independently as a separate
20 piece of equipment, or used in connection with other types
21 of garments.